UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,370	01/23/2002	Bhavin S. Khatri	GB 010012	7620

24737 7590 07/13/2005

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
LE, LANA N	

ART UNIT	PAPER NUMBER
2685	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/055,370	KHATRI, BHAVIN S.	
	Examiner	Art Unit	
	Lana N. Le	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10 and 13-15* is/are allowed.

6)☒ Claim(s) *1-9 and 12* is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5-6, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katz (WO 98/36596) in view of Shoki et al (US 6,087,986), Gladh (US 5,959,579), and further in view of Kukagawa et al (US 6,188,913).

Regarding claim 1, Katz discloses a radio communication system (system comprising a first station and a second station) having a communication channel (page 10, lines 38-40) comprising a plurality of paths between first and second terminals (first and a second stations) each having a plurality of antennas (antenna array; fig. 2),

the method comprising wherein the first terminal (first station) determining a plurality of directions via determining means (8) from which signals arrive from the second terminal (2nd station) (page 12, line 35 – page 13, line 24), receiving signals at a1-a8 to outputs (14a-h) from some or all of the plurality of directions.

Katz fails to further disclose:

means for extracting a plurality of sub-streams from the received signals and means for combining the plurality of sub-streams to provide an output data stream. However, extracting the original substreams in a particular frequency transmitted by the

desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al. Shoki et al disclose: means (29-32; fig. 3 and hereafter) for extracting a plurality of sub-streams from the received signals and means (33) for combining the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for extracting and means for combining the plurality of substreams in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Katz and Shoki et al fail to further disclose:

the transmitter having means for separating a signal for transmission into a plurality of sub-streams. Gladh discloses a transmitter having means (50) for separating a signal for transmission into a plurality of sub-streams (col 1, lines 34-58). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for separating a signal for transmission into a plurality of substreams in order to divide the signal into sub components to allow the antenna elements of the array antenna of Katz and Shoki et al to transmit the multistream signals and to reduce interference to adjacent antenna arrays of other transceivers.

Katz, Shoki et al, and Gladh fail to further disclose wherein the transmitting means includes control means for operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction.

Fukagawa et al disclose:

wherein the transmitting means includes control means for operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction (col 13, lines 61- col 14, line 5; col 33, lines 19-26; col 33, line 66 – col 34, line 13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a peak in the antenna pattern corresponds to the respective direction in order to orient the directivity of the antenna producing peaks of the modified terminal of Katz, Shoki et al, and Gladh in the direction of the other terminal to be able to mitigate interference with other adjacent terminals as suggested by Fukagawa et al (col 34, lines 1-13).

Regarding claim 2, Katz, Shoki et al and Gladh disclose the system of claim 1, wherein Katz disclose the receiving means further comprises means for determining an angular power distribution of incoming signals (page 22, lines 16-20).

Regarding claim 3, Katz, Shoki et al and Gladh disclose the system of claim 2, wherein Katz discloses the direction determining means further comprises means for selecting as the plurality of directions those directions from which the strongest signals arrive from the second terminal (page 3, line 37 – page 4, line 17).

Regarding claim 5, Katz, Gladh, and Kukagawa et al disclose the terminal of claim 4, wherein Katz discloses the receiving means further comprises means for receiving a plurality of respective signals from some or all of the plurality of directions.

Katz and Gladh do not disclose:

means for extracting a plurality of sub-streams from the received signals and,

means for combining the plurality of sub-streams to provide an output data stream.

However, extracting the original substreams in a particular frequency transmitted by the desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al.

Shoki et al disclose: means (29-32; fig. 3 and hereafter) for extracting a plurality of sub-streams from the received signals and means (33) for combining the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for extracting and means for combining the plurality of substreams in the terminal of Katz and Gladh in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Regarding claim 6, Katz, Gladh and Shoki et al disclose the terminal as claimed in claim 5, wherein it is well known in the art that the number of transmitted and received sub-streams are not equal. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have unequal transmit and receive substreams in order to allow the number of transmitted and received substreams be transmitted and received from different directions at random.

Regarding claim 12, Katz discloses a method of operating a radio communication system (system comprising a first station and a second station) having a communication channel (page 10, lines 38-40) comprising a plurality of paths between first and second terminals (first and a second stations) each having a plurality of antennas (antenna array; fig. 2),

the method comprising the first terminal (first station) determining a plurality of directions via determining means (8) from which signals arrive from the second terminal (2nd station) (page 12, line 35 – page 13, line 24), receiving signals (at a1-a8 to outputs 14a-h) from some or all of the plurality of directions.

Katz fails to further disclose:

extracting a plurality of sub-streams from the received signals and combining the plurality of sub-streams to provide an output data stream. However, extracting the original substreams in a particular frequency transmitted by the desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al. Shoki et al disclose: extracting via (29-32; fig. 3 and hereafter) a plurality of sub-streams from the received signals and;

combining (via 33) the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to extract and combine the plurality of substreams in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Katz and Shoki et al fail to further disclose:

the first terminal separating a signal for transmission into a plurality of sub-streams and transmitting each substream into a respective one of the plurality of determined directions. Gladh discloses a transmitter having means (50) for separating a signal for transmission into a plurality of sub-streams and transmitting each substream into a respective one of the plurality of determined directions (col 1, lines 34-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate a signal for transmission into a plurality of substreams in order to divide the signal into sub components to allow the antenna elements of the array antenna of Katz and Shoki et al to transmit the multistream signals and to reduce interference to adjacent antenna arrays of other transceivers.

Katz, Shoki et al, and Gladh fail to disclose operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction.

Fukagawa et al disclose:

operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction (col 13, lines 61- col 14, line 5; col 33, lines 19-26; col 33, line 66 – col 34, line 13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a peak in the antenna pattern corresponds to the respective direction in order to orient the directivity of the antenna producing peak of the modified terminal of Katz, Shoki et al, and Gladh in the direction of the other terminal that it is currently in communication with to prevent interference with communication between other adjacent terminals as suggested by Fukagawa et al (col 34, lines 1-13).

Regarding claim 13, Katz discloses a method of operating a radio communication system (system comprising a first station and a second station) having a communication channel comprising a plurality of paths between first and second terminals (first and a second stations) each having a plurality of antennas (antenna array; fig. 2) wherein the

first terminal (first station) comprises receiving means (a1-a8) having direction determining means (8) for determining a plurality of directions from which signals arrive from the second terminal (page 12, line 35 – page 13, line 24), receiving signals via (a1-a8) on outputs (14a-h) from some or all of the plurality of directions (page 12, line 35 – page 13, line 24);

and transmitting each substream into a respective one of the plurality of determined directions (page 3, line 37 – page 4, line 17).

Katz fails to further disclose:

extracting a plurality of sub-streams from the received signals and combining the plurality of sub-streams to provide an output data stream. However, extracting the original substreams in a particular frequency transmitted by the desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al. Shoki et al disclose: extracting (via 29-32; fig. 3 and hereafter) a plurality of sub-streams from the received signals and combining (via 33) the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to extract and combine the plurality of substreams in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Katz and Shoki et al fail to further disclose:

the method further comprising the first terminal separating a signal for transmission into a plurality of sub-streams. Gladh discloses the method further

comprising the first terminal (1st station) for separating a signal (via 50) for transmission into a plurality of sub-streams (col 1, lines 34-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate a signal for transmission into a plurality of substreams in order to divide the signal into sub components to allow the antenna elements of the array antenna of Katz and Shoki et al to transmit the multistream signals and to reduce interference to adjacent antenna arrays of other transceivers.

3. Claims 4 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katz (WO 98/36596) in view of Gladh (US 5,959,579) and further in view of Kukagawa et al (US 6,188,913).

Regarding claim 4, Katz discloses a terminal (BTS) for use in a radio communication system (page 11, lines 9-17) comprising a plurality of paths between the terminal (first station) and another terminal (second station)

wherein receiving means (a1-a8) are provided having direction determining means (8) for determining a plurality of directions from which signals arrive from the other terminal (page 12, line 35 – page 13, line 24),

and transmitting means for transmitting each substream into a respective one of the plurality of directions determined by the receiving means (page 3, line 37 – page 4, line 17).

Katz doesn't disclose:

the transmitting means having means for separating a signal for transmission into a plurality of sub-streams. Gladh discloses transmitting means are provided having means 50 for separating a signal for transmission into a plurality of sub-streams (col 1, lines 34-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for separating a signal for transmission into a plurality of substreams in order to divide the signal into sub components to allow the antenna elements of the array antenna of Katz to transmit the multistream signals and to reduce interference to adjacent antenna arrays of other transceivers.

Katz and Gladh fail to further disclose wherein transmitting means includes control means for operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction.

Fukagawa et al disclose:

wherein the transmitting means includes control means for operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction (col 13, lines 61- col 14, line 5; col 33, lines 19-26; col 33, line 66 – col 34, line 13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a peak in the antenna pattern corresponds to the respective direction in order to orient the directivity of the antenna producing peak of the modified terminal of Katz and Gladh in the direction of the other terminal that it is currently in communication with to

prevent interference with communication between other adjacent terminals as suggested by Fukagawa et al (col 34, lines 1-13).

Regarding claim 7, Katz and Gladh disclose a terminal as claimed in claim 4, wherein Katz further discloses wherein the receiving means further comprises means for determining an angular power distribution of incoming signals (page 22, lines 16-20).

Regarding claim 8, Katz and Gladh disclose the terminal as claimed in claim 7, wherein Katz disclose wherein the direction determining means further comprises means for selecting as the plurality of directions those directions from which the strongest signals arrive from the second terminal (page 3, line 37 – page 4, line 17).

Regarding claim 9, Katz, Gladh, and Kukagawa et al disclose a terminal as claimed in claim 4, wherein Kukagawa et al disclose the control means further adapt the antenna pattern for each substream such that nulls in the antenna pattern correspond to the directions in which other sub-streams are transmitted (col 34, lines 1-13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to adapt the antenna pattern for each substream such that nulls in the antenna pattern correspond to the directions in which other sub-streams are transmitted in order to prevent interference with communication between other adjacent terminals as suggested by Fukagawa et al (col 34, lines 1-13).

4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katz (WO 98/36,596) in view of Shoki et al (US 6,087,986) and further in view of Kukagawa et al (US 6,188,913).

Regarding claim 11, Katz discloses a terminal (BTS) for use in a radio communication system (page 11, lines 9-17) having a communication channel (page 10, lines 38-40) comprising a plurality of paths between the terminal (first station) and another terminal (second station),

wherein receiving means (a1-a8) are provided having direction determining means (8) for determining a plurality of directions from which signals arrive from the other terminal (page 12, line 35 – page 13, line 24);

means (a1-a8) for receiving a plurality of respective signals from some or all of the plurality of directions (page 12, line 35 – page 13, line 24).

Katz fails to further disclose:

means for extracting a plurality of sub-streams from the received signals and means for combining the plurality of sub-streams to provide an output data stream. However, extracting the original substreams in a particular frequency transmitted by the desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al. Shoki et al disclose: means (29-32; fig. 3 and hereafter) for extracting a plurality of sub-streams from the received signals and means (33) for combining the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for extracting and means for combining the plurality of substreams in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Katz and Shoki et al fail to further disclose transmitting means with control means for operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction.

Fukagawa et al disclose:

transmitting means with control means for operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction (col 13, lines 61- col 14, line 5; col 33, lines 19-26; col 33, line 66 – col 34, line 13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a peak in the antenna pattern corresponds to the respective direction in order to orient the directivity of the antenna producing peak of the modified terminal of Katz and Shoki in the direction of the other terminal that it is currently in communication with to prevent interference with communication between other adjacent terminals as suggested by Fukagawa et al (col 34, lines 1-13).

Allowable Subject Matter

5. Claims 10 and 13-15 are allowable over the cited prior art

Regarding claims 10 and 13, they are rewritten in independent form including all of the limitations of the base claim and any intervening claims and are therefore

allowable for the same reason as set forth in the allowable subject matter of the previous office action filed 12/03/04.

Regarding claims 14 and 15, the combined cited prior art fail to disclose or suggest for the same reason as objected claims 10 and 13 of the previous office action filed 12/03/04 and are therefore allowable for the same reason as set forth in the allowable subject matter.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N Le whose telephone number is (703) 308-5836. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lana Le

July 05, 2005